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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/667,297 | 09/22/2000 | Eric R. Lovegren | R11.12-0701 | 1706 |

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| EXAMINER | |
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| WEST, JEFFREY R | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2857 | |

DATE MAILED: 09/08/2003.

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) |
|---|---|---|
| | 09/667,297 | LOVEGREN ET AL. |
| | Examiner | Art Unit |
| | Jeffrey R. West | 2857 |

*-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period f r Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *03 July 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *03 July 2003* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 9 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Claim R jections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 17-20 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,198,424 to Diede et al.

Diede et al. discloses a radar level transmitter for providing level detection of materials in a container comprising an antenna (column 3, lines 28-30), a transceiver coupled to the antenna to transmit a microwave pulse and produce a signal representing reflected wave pulses (column 3, lines 41-44 and 64-67), a

microprocessor system coupled to the transceiver that controls the transceiver and processes the signal (column 3, lines 13-26), a threshold calculation module, executable by the microprocessor system, to calculate first or second threshold values as a function of the amplitude and properties of the materials (column 4, lines 13-22), a level calculation module to calculate the level of a first or second material interface using the signal and threshold values (column 3, lines 10-16 and column 4, lines 61-65), an input/output port on the transceiver to transmit the level of first material interface (column 2, lines 46-52 and column 3, lines 19-24), and a dielectric constant calculator on the transmitter to calculate, and provide to the threshold calculator, the dielectric constant of a material as a function of the amplitude and first reflected pulse (column 3, lines 10-13, column 4, lines 54-58, and column 5, lines 14-27).

Further, since, as noted above, Diede et al. discloses the idea of setting the threshold value for a pulse as a function of the pulse's reflected amplitude and also discloses that the pulse's reflected amplitude is a function of the amplitude of the transmitted pulse (column 5, lines 14-25 and column 6, lines 23-28), it is considered inherent that the threshold value is also calculated as a function of the transmit pulse amplitude.

3. Claims 17-20 are rejected under 35 U.S.C. 102(a) as being anticipated by International Publication No. WO 00/43806 to Diede.

Diede discloses a radar level transmitter for providing level detection of materials in a container comprising an antenna (page 5, lines 24-27), a transceiver coupled to the antenna to transmit a microwave pulse and produce a signal representing reflected wave pulses (page 6, lines 5-9 and page 7, lines 1-6), a microprocessor system coupled to the transceiver that controls the transceiver and processes the signal (column 5, lines 7-11), a threshold calculation module, executable by the microprocessor system, to calculate first or second threshold values as a function of the amplitude and properties of the materials (page 7, lines 18-28), a level calculation module to calculate the level of a first or second material interface using the signal and threshold values (page 5, line 9 and page 8, lines 3-16), an input/output port on the transceiver to transmit the level of first material interface (page 3, line 30 to page 4, line 2 and page 5, lines 15-20), and a dielectric constant calculator on the transmitter to calculate, and provide to the threshold calculator, the dielectric constant of a material as a function of the amplitude and first reflected pulse (page 5, line 8, page 8, lines 25-29, and page 9, line 23 to page 10, line 5).

Further, since, as noted above, Diede teaches the idea of setting the threshold value for a pulse as a function of the pulse's reflected amplitude and also discloses that the pulse's reflected amplitude is a function of the amplitude of the transmitted pulse (page 9, line 23 to page 10, line 5 and page 10, lines 19-23), it is considered inherent that the threshold value is also calculated as a function of the transmit pulse amplitude.

***Claim R jections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2, 4, 5, 7, 8, 10-13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over International Publication No. WO 00/43806 to Diede in view of U.S. Patent No. 5,609,059 to McEwan.

As noted above, Diede teaches many features of the claimed invention including the idea of setting the threshold value for a pulse as a function of a the pulse's reflected amplitude (page 7, lines 24-28), and detecting first, second, and fiducial reflected pulses, using a different threshold value for each of the pulses (page 7, lines 18-24 and Figures 4 and 5), wherein a first reflected pulse corresponds to the portion of a transmitted microwave pulse reflected at a first material interface between air and a first product (page 11, lines 2-5), having a dielectric constant calculated by a dielectric constant calculator (page 8, lines 25-29), a second reflected pulse corresponding to the portion of a transmitted microwave pulse reflected at a first material interface between the first product and a second product (page 10, line 29 to page 11, line 1 and page 12, lines 18-20), and a fiducial pulse corresponding to the portion of a transmitted microwave pulse reflected at the

fiducial interface between the antenna, or launch plate, and the air around the antenna (page 6, lines 13-17).

Diede also teaches calculating the amplitude of the first reflected pulse as a function of the dielectric of a second material and the amplitude of a reference waveform (page 9, line 23 to page 10, line 5), in this case the fiducial pulse (page 11, lines 14-15), and, with respect to claim 16, Diede teaches the aforementioned method of threshold calculation along with the older conventional method of first calculating the threshold value as a function of a user-entered dielectric constant (page 2, lines 14-18), but does not teach incorporating the dielectric parameter of a first material and a correction factor in calculating the first reflected pulse amplitude.

McEwan teaches an electronic multi-purpose material level sensor that determines the level of a product by measuring the time delay between transmitted and received reflected pulses (column 6, lines 22-28) wherein the magnitude of the reflected pulse is calculated as a function of the dielectric constant of the first material, air, and the dielectric of the second material (column 6, lines 29-34), and all the reflected pulse measurements are corrected by taking the measurements between the fiducial pulse and the reflection pulse relative to the antenna, or launcher plate, rather than to the transceiver (column 6, lines 49-53).

It would have been obvious to one having ordinary skill in the art to modify the invention of Diede to include incorporating the dielectric parameter of the first material and a correction factor in calculating the first reflected pulse amplitude, as taught by McEwan, because the combination would provide more accurate

measurements, by taking into account variance in the dielectric of the first material, air, instead of using calculations that assume it to be 1, as is a common practice, and further, as suggested by McEwan, the combination would have reduced or eliminated errors and drift introduced by the cable (column 6, lines 49-53).

With respect to claims 4 and 7, as noted above, Diede teaches detecting each of the pulses using a threshold value, and the method of setting a threshold value for each pulse as a function of the pulse's reflected amplitude. It would have been obvious to one having ordinary skill in the art to include the correction factor and the dielectric of the first material, as taught by McEwan, with the method of calculating a pulse amplitude, as taught by Diede, for each of the first, second, and fiducial pulses to obtain the threshold values, because the combination would provide the suggested accuracy to each of the pulses amplitude calculations, rather than just for the first pulse.

6. Claims 3, 6, 9, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Diede in view of McEwan, and further in view of U.S. Patent No. 5,500,649 to Mowrey et al.

As noted above, Diede and McEwan teach many of the features of the claimed invention, including preventing attenuation error in the reflected pulse measurement (McEwan, column 5, lines 15-21) and insuring that the threshold value remains at a valid level by applying a range factor (McEwan, column 4, lines 35-50) but does not teach setting a threshold value as a function of an offset value.

Mowrey teaches a method and apparatus for monitoring the thickness of a coal rib comprising a transmitter that transmits radio waves toward the coal rib, a receiving means that receives a portion of the reflected energy from the air-coal interface, and a processor means that determines the thickness of the coal rib by calculating the difference between the transmitting and reflecting times (column 2, line 60 to column 3, line 19). Mowrey further teaches adjusting the radar signal, by an offset value, to change the wave-detecting threshold value to an acceptable level (column 7, line 65 to column 8, line 10).

It would have been obvious to one having ordinary skill in the art to modify the invention of Diede and McEwan to include setting a threshold value as a function of an offset value, as taught by Mowrey, because as suggested by Mowrey, the combination would have provided a method of obtaining accurate results by calibrating the transmitter and receiver based on the current operating conditions (column 8, lines 6-10).

### *Response to Arguments*

7. Applicant's arguments filed 03 July 2003 have been fully considered but they are not persuasive.

Applicant first argues, with respect to the rejection of claims 17-20 under 35 U.S.C. 102(e), that "Diede looks at the reflected fiducial pulse 310. [Col. 4, lines 19-22]. This is not the transmit pulse amplitude as stated in claim 17." The Examiner maintains that the instant invention does not directly calculate the threshold value as

a function of the transmit pulse amplitude. The instant invention calculates the "first threshold value T1 as a function of the estimated first pulse amplitude" (page 16, lines 19-21) wherein the "estimated first pulse amplitude relates to the first reflected wave pulse 44 corresponding to a portion of the transmitted microwave pulse that is reflected at first material interface 18" (page 16, lines 10-13). The instant invention, however, does provide that "the estimated first pulse amplitude is calculated as a function of the reference amplitude" (page 16, lines 6-8) wherein the "reference amplitude is set to a value that relates to the amplitude of the transmitted microwave pulse" (page 16, lines 1-3).

Diede et al. also teaches this method. As stated by the Examiner, and admitted by Applicant, Diede et al. "teaches the idea of setting the threshold value for a pulse as a function of the pulse's reflected amplitude" (response filed October 14, 2002, page 5). Diede et al. also discloses that the pulse's reflected amplitude is a function of the amplitude of the transmitted pulse (column 5, lines 14-25 and column 6, lines 23-28) and therefore the threshold value is also calculated as a function of the transmit pulse amplitude as claimed.

Applicant then argues against the inherency argument that the threshold value is also calculated as a function of the transmit pulse amplitude because, "[i]n particular, the cited sections of Diede et al. (column 5, lines 14-25 and column 6, lines 23-28) refer to the calculation of a dielectric constant of a first product rather than a threshold value." As described above, the cited sections are to teach that the reflected pulse amplitude is a function of the transmitted pulse.

Applicant then argues that "[b]ecause Diede et al. fail to disclose or suggest the invention, the Examiner relies upon Applicant's disclosure to discern the "obviousness" of the claim." The Examiner asserts that, as noted above, the invention of Diede et al. discloses all of the features of the claimed invention, and accordingly there is no "obviousness" argument.

A similar explanation pertains to Applicant's arguments regarding the rejection of claims 17-20 under 35 U.S.C. 102(a) as being anticipated by International Publication No. 00/43806 to Diede.

Next, Applicant argues the rejection of claims 1, 2, 4, 5, 7, 8, 10-13 and 16 under 35 U.S.C. 103(a) as being unpatentable over International Publication No. WO 00/43806 to Diede in view of U.S. Patent No. 5,609,059 to McEwan.

First, Applicant argues that "Diede fails to disclose the setting of a first threshold value as a function of an estimated first reflected pulse that is calculated using "a reference amplitude of a transmitted microwave pulse" or ["]a second dielectric parameter having a value corresponding to a dielectric of a second material located below the first material" and "neither of the cited references discloses a step of "setting a first threshold value as a function of the . . . first reflected pulse amplitude", as described in independent claims 1 and 10."

The Examiner maintains that, as noted above, the invention of Diede does disclose setting a first threshold value as a function of an estimated first reflected pulse that is calculated as a function of a reference amplitude of a transmitted

microwave pulse and further discloses using a second dielectric parameter having a value corresponding to a dielectric of a second material located below the first material $\varepsilon_R$ (page 9, line 23 to page 10, line 5). Further, the Examiner maintains that the invention of Diede also discloses setting the threshold value for a pulse as a function of the pulse's reflected amplitude (page 7, lines 24-28).

Applicant then argues, "McEwan is unrelated to the automatic setting of threshold values for use by a microwave level transmitter. Moreover, McEwan fails to disclose any use of a calculated reflected pulse amplitude to set a threshold value. Additionally, the cited "correction factor" of McEwan at column 6, lines 49-53 is unrelated to a threshold calculation. Instead, the cited "correction factor" relates to the reduction of errors and drift that are introduced by the cable 16 due to the taking of measurements between the fiducial pulse and the reflected pulse relative to the launcher plate 18 rather than to the transceiver 12. Therefore, McEwan fails to disclose or suggest the use of a correction factor in the calculation of a first threshold value as described in independent claims 1 and 10."

The Examiner asserts that the invention of McEwan is only included to teach incorporating the dielectric parameter of a first material and a correction factor in calculating the first reflected pulse amplitude, not the use of a calculated reflected pulse amplitude to set a threshold. The Examiner also asserts that, with respect to Applicant's argument that the "correction factor" of McEwan is unrelated to a threshold calculation, the invention of Diede teaches setting a threshold value for a

pulse as a function of the pulse's reflected amplitude and the invention of McEwan teaches using the "correction factor" or correct the reflected pulse measurements, such as the reflected pulse measurements of Diede. In this way, the combination of Diede and McEwan teaches a "correction factor" for use in threshold setting.

***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (703)308-1309. The examiner can normally be reached on Monday thru Friday, 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (703)308-1677. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7382 for regular communications and (703)308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

jrw
September 4, 2003

MARC S. HOFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800